

CENTENARY COLLEGE OF LOUISIANA

12th Annual
**Student
Research
Forum**

APRIL 11, 2003

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**Student
Research
Forum**

April 11, 2003

Posters

Carlile Auditorium

(Mickle Hall 114)

12 – 12:30 pm

Humanities

Social Sciences

Kilpatrick Auditorium

(Smith Building)

1:30 – 5:20 pm

Natural Sciences

Carlile Auditorium

(Mickle Hall)

2 – 4:30 pm

12th Annual **Student Research Forum**

SPONSORED BY

Centenary Book Bazaar and
Provost and Dean of the College

JUDGES

Dr. Katherine Brandl
Dr. Rosemary Seidler
Ms. Jennifer Strange
Dr. R. Matthew Weeks

FROM THE DIRECTOR

Thank you participants and advisers for doing the research projects and presenting your work in this forum. This 12th annual forum is the largest and hopefully "the best" one to date.

Thank you judges, for your time and effort on this great event.

A special thanks is given to the Centenary Book Bazaar for its financial support. It is greatly appreciated!

A sincere thanks is also given to the Provost and Dean of the College, Dr. Darrel Colson, for all of his encouragement and financial support.

Thank you Ms. Jeannie Clements, Office of the Provost, and Ms. Peggy Cooper, Office of Public Relations, for all your work on the brochure, refreshments, etc. You are the best!

Alfred McKinney, Director
12TH ANNUAL STUDENT RESEARCH FORUM

Research Posters

Posters (Judging)

MICKLE HALL 114

Julia H. Fraser, Biological Sciences	12 – 12:30 pm
Marc Gewin, Chemistry	
Ryan R. Kraemer, Biology	
April Landry, Physiology	
Lacey Millet, Biological Sciences	
Amy Waguespack, Neuroscience	

Research Papers

Social Sciences

KILPATRICK AUDITORIUM

Christi S. Hay, Business	1:30 pm
Brandon Lawson, Political Science	1:40 pm
Harmony Newman, Sociology	1:50 pm
Esther Seitz, Economics	2:00 pm
Mark Nonis, Finance	2:10 pm
Mallory Woods, Finance	2:20 pm
Break	2:30-2:50 pm

Humanities

KILPATRICK AUDITORIUM

Megan McWaters, Philosophy	2:50 pm
Laci Lee Adams, Religion	3:00 pm
David Edwards, History	3:10 pm
Rebecca Jane Eskew, English	3:20 pm
Claire C. Galloway, History	3:30 pm
Lisa Game, English	3:40 pm
Jonathan M. Hammett, Religion	3:50 pm
Break	4:00-4:20 pm
Susanna Miller, Religion	4:20 pm
Valerie B. Olson, Religion	4:30 pm
Stuart Ponder, Philosophy	4:40 pm
Billy Pritchard, History	4:50 pm
Charlie Starnes, Religion	5:00 pm
Michael Wilson, Religion	5:10 pm

Natural Sciences

CARLILE AUDITORIUM

Benjamin F. Pierce, Chemistry	2:00 pm
Robert Beaird, Physics	2:10 pm
Patrick Culver, Neuroscience	2:20 pm
Heather Day, Chemistry	2:30pm
Marc Gewin, Chemistry	2:40 pm
C. Sean Hauser, Biology	2:50 pm
Break	3:00-3:20 pm
Ryan R. Kraemer, Biology	3:20 pm
Sun-Hee Lee, Forensic Medicine	3:30 pm
Michelle Magee, Chemistry	3:40 pm
Katie Poole, Geology	3:50 pm
Ebonee Spencer, Biology	4:00 pm
Sarah Stringer, Physiology	4:10 pm
G. Russell Young, Geology	4:20 pm

***Drosophila melanogaster* Nopp140 Expression and Interactions**

JULIA H. FRASER

DEPARTMENT OF BIOLOGICAL SCIENCES
LOUISIANA STATE UNIVERSITY
BATON ROUGE, LA

We characterized the expression patterns and interactions of a transformed *Drosophila melanogaster* fly line that expressed a Green Fluorescent Protein (GFP) – tagged Nopp140 nucleolar protein. The transformation developed for *Drosophila* expressed Nopp140 via the random insertion of a P[hs:GFP-Nopp140] cDNA. The heat shock (hs) promoter drives Nopp140 mRNA transcription, and the GFP-DNA sequence encodes the Green Fluorescent Protein (GFP), which is fused in frame with Nopp140. When expressed by heat shock, the fusion protein localized to the nucleoli and retained its fluorescence for almost two weeks after only one heat shock.

Homozygous GFP-Nopp140 females were crossed to heterozygous Nop60B (Nap57) males. A second cross was made to determine if a new combination of alleles would yield variations in the fluorescence of the protein. It was observed that there were no differences in fluorescence, even in multiple tissue types, such as the malpighian tubules and intestines.

Another cross was made using homozygous GFP-Nopp140 males and heterozygous bobbed females. The bobbed mutation is a deletion of part of the chromosome that codes for normal production of ribosomes. This cross is still under study.

An additional project was initiated to express *Drosophila* fibrillarin, another nucleolar protein, as a GFP – tagged protein. Thus far, we have been unable to create the adequate amount of PCR product needed to carry out the ligation.

The Working Reality of Low-Temperature CdSe Semiconducting Nanocrystal Synthesis and the Mathematical Modeling of Crystallization

MARC GEWIN

DEPARTMENT OF CHEMISTRY
UNIVERSITY OF ARKANSAS
FAYETTEVILLE, AR

Low-temperature synthesis towards the functional size and quality control of cadmium-based nanocrystals, as well as the mathematical modeling and simulation of basic crystallization, is investigated. The trials were to determine, among a host of variable factors, what combinations of techniques and chemical species produced high-yield, high-monodispersed, easily growth-controlled cadmium-selenide nanocrystals (quantum dots, specifically). Some such variables are cadmium and selenium precursors, types of noncoordinating solvents and coating ligands, and reaction temperatures. Such developed techniques are compared to proven, high-temperature techniques and critiqued. A few novel digressions are found in data, affected by ligand concentration and “doping” techniques involving the noncoordinating solvent. Crystallization modeling and simulations are highlighted to balance conflicting views and data between classic crystallization theory and current experimental results. A working model is sought to bridge the differences between the two.

Nitric Oxide (NO) and Hypoxia: Production of NO-stores via a NOS- Independent Mechanism?

RYAN R. KRAEMER

RESEARCH ADVISOR: DR. BETH LEUCK
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CENTENARY COLLEGE OF LOUISIANA
SHREVEPORT, LA

Ischemia (localized tissue anemia due to obstruction of arterial blood flow) and reperfusion (reconstitution of blood flow) occur during heart attacks, strokes, as well as during many surgical procedures, and often result in tissue injury. Despite intense research, the mechanisms underlying *ischemia/reperfusion* injury are incompletely understood. What appears clear, however, is that somehow nitric

oxide (NO) is involved in both deleterious and protective actions. NO can not be produced via nitric oxide synthase due to the lack of available oxygen; however, nitrite could be reduced to produce NO under ischemic conditions. An initial organ bath experiment with Wistar rat aortic rings revealed that NO-stores increased 300-600% following a period of hypoxia. To investigate the possibility that these stores are formed via nitrite, we quantified basal levels of nitrite in several organs and secondly, determined that an increase in nitrite availability resulted in increased levels of NO-stores *in vivo*. Increase in tissue nitrite was associated with a drastic increase in S-nitrosothiol levels (22-fold and 83-fold in liver and heart) and N-nitrosoamines. These results indicate massive nitrosation of both thiols and amines with increased availability of nitrite. Both compound classes have been shown to release NO under appropriate conditions, suggesting a NOS-independent mechanism for NO production under physiological conditions.

Insertion of Adenine Opposite 8-oxo-7,8-dihydroguanine(8oxoG): Comparison of a Single Lesion with a Multiply Damaged Site

APRIL LANDRY
SVITLANA MALYARCHUK
RENEAU YOUNGBLOOD
ELIZABETH QUILLIN,
LYNN HARRISON

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A multiply damaged site (MDS) is defined as = two lesions within a distance of 10-15 base pairs (bp). MDS generated by ionizing radiation have been shown to contain oxidative base damage, and *in vitro* studies have indicated that if the base damage is less than 3 bp apart, repair of one lesion is inhibited until repair of the lesion in the opposite strand is completed. Inhibition of repair could result in an increase in the mutation frequency of the base damage. We have designed an assay to determine whether a closely opposed lesion causes an increase in adenine insertion opposite an 8-oxoG in bacteria. We have positioned the MDS (an 8-oxoG in the transcribed strand and a second 8-oxoG immediately 5' to this lesion in the non-transcribed strand) within the firefly luciferase coding region. During two rounds of replication, insertion of adenine opposite the 8-oxoG in the transcribed (T) or non-transcribed (NT) strand results in a translation termination codon at position 444 or 445, respectively. The trun-

cated luciferase protein is inactive. We have generated double-stranded oligonucleotides that contain no damage, each single 8-oxoG or the MDS. Each double-stranded molecule was ligated into the reporter vector and the ligation products transformed into wild type, Fpg-deficient or MutY-deficient bacteria. Colonies were screened for luciferase activity by directly spraying with luciferase substrate. Colonies that did not express luciferase activity were selected and the plasmid DNA isolated and sequenced to determine the mutation. We are in the process of screening colonies. We have detected a translation stop (TAA) at codon 444 in 0.13%, 0.14% and 0.48% of the total colonies using a single 8-oxoG in Fpg-deficient, wild type and MutY-deficient bacteria, respectively. The deficiency in MutY enhanced the frequency of mutation at a single 8-oxoG (T strand) by 3.4 times, but the frequency was not altered by a deficiency in Fpg. However, adenine insertion opposite a similar 8-oxoG (T strand) situated within the MDS was detected in 0.22% and 0.23% of the total colonies in Fpg-deficient and wild type bacteria, respectively. Initial results suggest a 1.7-2 times enhanced frequency of adenine insertion opposite the 8-oxoG (T strand) within the MDS. However, further screening is required to determine whether the frequency of mutation detection represents a significant difference.

Adaptations to Load Changes in the Locomotor Systems of Terrestrial and Amphibious Crabs

LACEY MILLET

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We are interested in the mechanisms underlying adaptation to load by locomotor systems. Amphibious shore crabs such as the red clawed crab (*Sesarma mederi*) must routinely accommodate load changes as they move in and out of water, where buoyancy supports a large percentage of their weight. More terrestrial crabs, such as fiddler crabs (*Uca pugnax*), are not exposed routinely to such large load changes. By comparing the gaits of these related animals both in and out of water, we hope to gain an understanding of how these animals cope with the load changes during locomotion. We study these adaptations in freely-

behaving animals. We simultaneously videotape the animals with several cameras and use a commercially available 3-D motion analysis system to determine the kinematics of individual legs. From this, we get gait patterns for each animal. Fiddler crabs use an alternating tetrapod gait when on land about 80% of the time, having a swing phase that lasts approximately 38% of the step cycle. Occasionally, the fiddler crabs use other less common gaits. The fiddler crabs also use an alternating tetrapod gait in the water, but each of the legs spend approximately 55% of the step cycle in the swing phase. Studies on the red clawed crab are in progress. Next, we plan to examine the postural systems of the crabs by marking points on each segment of each crab leg, and using the motion analysis system to determine their limb kinematics.

Naris Occlusion Causes Enhanced Olfactory Marker Protein Immunoreactivity: Specificity, Localization, and the Effect of Deprivation Duration

AMY WAGUESPACK

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Olfactory Marker Protein (OMP) is a cytosolic protein of unknown function expressed in mature olfactory receptor neurons (ORN). Recently, we have shown that naris occlusion (NO) enhances OMP immunoreactivity (IR), results relevant to theories of OMP function. To confirm and extend our results we studied the specificity of this enhanced IR effect and its rostrocaudal characteristics using immunocytochemistry (ICC) and Western blot analysis. Mice underwent unilateral NO on the day after birth. On postnatal days (PND) 6, 12, 18, 24, NO and control mice were prepared for ICC using standard methods. On PND 18, another group of NO and control mice were prepared for Western blot analysis using standard methods. For the ICC, sections were incubated with antibody for OMP, Neuron Specific Enolase (NSE) or Phosphodiesterase 4A (PDE4A). Western blots were probed only with OMP antibody. Enhanced IR, ipsilateral to NO, was detectable in

some tissue sections on PND 12 but did not become consistent until PND 18. Western blots at PND 18, were consistent with ICC results. NSE-IR was not increased after NO, but PDE4A-IR was enhanced. IR was consistent across rostrocaudal sections of the nasal cavity. From our results and previous research, we propose that OMP may play a role in transduction in the mucosa.

Research Papers

Social Sciences

Sports Utility Vehicles: Tax Avoidance for Businesses

**PRESENTER: CRISTI S. HAY
KEVIN E. ATAMAH**

FROST SCHOOL OF BUSINESS
CENTENARY COLLEGE OF LOUISIANA
SHREVEPORT, LA

Safety factors and consumer preferences have been considered reasons for the steady increase in sales of sports utility vehicles. Another reason for the increase in sales may be the tax preference sports utility vehicles offer businesses. The purpose of this research is to understand the impact Code Sec. 280F has had on the increase in sales of sports utility vehicles. The Code Sec. 280F dollar caps on auto depreciation deduction apply only to passenger automobiles. By not being considered passenger automobiles, some of the larger sport utility vehicles with gross vehicle weight ratings in excess of 6000 pounds allow businesses to avoid the depreciation limitations.

Merit Selection or Partisan Election: Does Judicial Selection System Really Matter?

BRANDON LAWSON

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In 1940, the state of Missouri became the first state to adopt merit selection for the selection of state court judges. Voters approved a plan calling for a judicial nominating commission from which the governor would

appoint judges. After a set term, each judge would then stand be placed on a retention ballot, where the public would be asked if they should be allowed to retain their seat on the bench. Since 1940, it has become the most popular form of judicial selection. However, debate still rages as to which method of selection results in the best judges. This presentation will focus on the consequences of merit selection as compared to the partisan election of judges by using a pairing of similar states: North Carolina and Tennessee. The comparison will focus on three aspects of judicial quality: the characteristics of individual judges, the operation of the state courts of last resort, as well as the performance of the state courts of last resort. Based on the theoretical balance that merit selection provides between judicial independence and public accountability, the Tennessee Supreme Court is expected to be of higher quality than the North Carolina Supreme Court.

To Escape or Endure Adolescent Pregnancy: The Impact of Agency on Sexual Decision-Making

HARMONY NEWMAN

RESEARCH ADVISOR: DR. MICHELLE WOLKOMIR
DEPARTMENT OF SOCIOLOGY
CENTENARY COLLEGE OF LOUISIANA
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This study seeks to identify key differences between the sexual decision-making processes of teenage girls who have experienced pregnancy and those who have not. To analyze these processes, the author compares two groups of teenage girls in an at-risk poor community: one composed of teen mothers and another of never-pregnant teens. Further, this study proposes that the life experiences of teens create a framework from which they make decisions. When applied to sexual decisions, this framework has a great impact on behavioral outcomes, such as having or not having sex. To understand this framework the author examines (1) the significance of a role model in developing a sense of agency; (2) how the ability to succeed influences future expectations; and (3) how agency and future planning impact sexual decision-making.

Regression Analysis of Lung Cancer Causes

ESTHER SEITZ

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This econometric research was conducted in order to investigate what factors, ranging from environmental to sociological, affect lung cancer death rates. In order to observe the ever-growing threat of lung cancer within American society a regression was run with the lung cancer death rate for each U.S. state as the dependent variable. An array of independent variables thought to affect lung cancer deaths are then regressed against the dependent variable. The independent variables are selected in order to explain the behavior of the lung cancer death rates for each of the 50 states. They include: adult smoking percentage, cigarette tax, number of nuclear power plants, and population percentage of Africa Americans. Each of these explanatory variables is included per U.S. state and analyzed in order to explain their effects upon lung cancer statistics. While the final regression affirms the expected relationships between the lung cancer death rates and independent variables others behave in entirely unanticipated fashions.

As lung cancer has established itself as the leading cancer killer among Americans this regression attempts to capture the essential factors that promote or diminish its grim reign. Regression analysis employing Ordinary Least Squares was conducted with the help of E-views software that compiled regressions in visual form.

Compensation Analysis of Top Executives in the Banking Industry

PRESENTER: MARK NONIS
JAY JAMISON

DEPARTMENT OF FINANCE
RESEARCH ADVISOR: DR. HELEN SIKES
CENTENARY COLLEGE OF LOUISIANA
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This resource examines four measures of compensation for the top five executives for each company in the banking

industry from 1992 to 2001. The research is comprised of 5800 compensation schedules, reporting for the top five executives for each bank over a period of ten years. It shows a strong correlation between one of the measures, bonus payments, and total compensation levels for top executives. The research also shows that as executive rank increases, there will be significant increases in total compensation. This study implies that total compensation of the executive could be directly influenced by the bank's performance and by factors, such as disintermediation, that may influence or affect the firm's performance. Therefore, the research shows that as the bank's performance falls, so does executive compensation for bank executives. Poor performance of the banks in the industry may be a result of industry influences such as fluctuating interest rates and the performance of the stock market. Compensation may vary between the top executives, but will always be influenced by the performance of the firm.

Executive Compensation within the Pharmaceutical Industry

PRESENTERS:
MALLORY WOODS
ANASTASIA TAYLOR

FROST SCHOOL OF BUSINESS, FINANCE
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Executive compensation and the way that it is being determined has become an area of concern due to incremental increases in executive pay over the years 1992-2001. The gap between non-executive pay and executive pay has become increasingly significant during this time period. There have been many studies on what determines executive compensation levels in various industries. One industry in particular that is lacking substantial research is the pharmaceutical industry.

This study focuses on the pharmaceutical industry executive compensation pay structure and identifies the variables that affect levels of compensation such as age, gender, and duration of employment. Our benchmarks for compensation levels are base salary, annual bonus, and other compensation at the five highest paid executive levels for approximately 284 firms in the pharmaceutical industry.

Research Papers

Humanities

Do You See What I See: An Experiment on the McCollough Effect

PRESENTER: MEGAN MCWATERS
DR. KENNETH AIZAWA

DEPARTMENT OF PHILOSOPHY
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The McCollough Effect (ME) is a color-contingent after effect. A subject is shown a certain stimuli of alternating color grids, such as a red and black vertical grid and a green and black horizontal grid, during an induction period of several minutes. Subjects are then shown achromatic and black vertical and horizontal test grids. On the achromatic part of the grid the subject will then see the complementary color of what they were induced with. If a subject was induced with red/black vertical grids and green/black horizontal grids, he will see a faint green color on the vertical achromatic/black test grids and a faint red color on the achromatic/black horizontal test grids.

Our experiment involved differing the induction stimuli. We used three different pairs: wholes (each grid was either all red/black or green/black), halves (each grid was split with red/black vertical grating on one half and green/black horizontal grating on the other) and quarters (the stimuli was broken up into fourths). This experiment was designed to test a theory that the ME is actually the visual system's correction for a constraint violation, and to determine if it is local or global factors in the stimuli that induce the effect.

Queer Church

LACI LEE ADAMS

RESEARCH ADVISOR: DR. DAVID OTTO
DEPARTMENT OF RELIGIOUS STUDIES, HUMANITIES
CENTENARY COLLEGE OF LOUISIANA
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Judith Butler's *Gender Trouble: Feminism and the Subversion of Identity* (1991) and Elisabeth Schussler Fiorenza's *The Discipleship of Equals: A Critical Feminist*

Ekklesia-Logy of Liberation (1993) suggest radicalized designs of gender and community. In *Gender Trouble*, Butler establishes the performative aspect of gender and sexuality by challenging the contemporary constructions of gender and questioning the normativity of heterosexuality. In *The Discipleship of Equals*, Fiorenza applies a biblical feminist hermeneutic to the idea of early Christian assemblies (*ekklesia*) demonstrating their radical equalitarian nature, principally in terms of elevation of the status of women. By blending these two theoretical constructs, the author of this paper hopes to fashion a postmodern model of queer church, which integrates and elevates broad constructions of gender and sexuality.

Butler's *Gender Trouble* and Fiorenza's *The Discipleship of Equals* serve as the beginnings of two lines of research. Supplementary resources, such as critiques and reviews of both these books, augment and refine the research. Finally, the author produces a marriage of the two major concepts discussed above by analyzing their significance to gender and sexuality.

The paper presents an alternative model of church, which intentionally includes and elevates non-normative expressions of gender and sexuality

The Struggle to Start Head Start in Shreveport, Louisiana, 1965-1975

DAVID EDWARDS

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SHREVEPORT, LA

In 1965, President Lyndon Johnson's administration launched Head Start, a radical pre-school education program that intended to aid children and eventually bring communities out of poverty. One year later Community Action Program-Caddo and Bossier introduced Head Start to Shreveport in the face of heavy opposition. Throughout the first ten years of operation, Head Start overcame racial tensions, both within the program and within the community, and financial uncertainties to achieve its many goals. This presentation chronicles the formation and transitions of Head Start in Shreveport, including the obstacles the program faced and its accomplishments.

The major resource used to construct this history was Helen Goss' personal papers, which are located at the Archives and Special Collections of Noel Memorial Library on the campus of Louisiana State University, Shreveport.

These primary source papers include personal correspondences, official Head Start documents, and newspaper articles. Additional newspaper clippings and documents were also obtained from scrapbooks kept at the local Head Start Office. Pictures in the albums also shed light on the early history of the program. Secondary sources used for this presentation include Adam Fairclough's *Race and Democracy* and James Patterson's *Grand Expectations: The United States, 1945-1974*.

Macbeth: What Shakespeare is Really Saying About James I

REBECCA JANE ESKEW

RESEARCH ADVISOR: DR. KIM VANHOOSIER-CAREY
DEPARTMENT OF ENGLISH
CENTENARY COLLEGE OF LOUISIANA
SHREVEPORT, LA

Most literary critics believe that Shakespeare wrote *Macbeth* to defend James's kingship and to send a warning about what can happen to those who might attempt to overthrow the foreign ruler. However, my contention is that while Shakespeare includes some elements which demonstrate his support of James, he uses this veneer of support to hide a strong critique of James' practices and, in fact, his legitimacy. After all, James was Shakespeare's employer; the playwright could not blatantly disagree or offend him. I intend to prove that Shakespeare, in writing and performing this play, questions a few of James's key beliefs and policies, namely his belief in and prosecution of witches and his right to sit on the English throne. For example, Shakespeare's witches prophesize that the character Banquo will produce an heir to succeed to the throne. Since James traced his lineage and thus legitimated his rule through this historical Banquo, this scene seems to support James' power. But in the play, Banquo is murdered, without his heir seizing power. Therefore, I argue that the inclusion of this character actually serves as a challenge to James' construction of legitimacy.

Devout Caretaking: Mary Elizabeth Rives, Motherhood, and Family in Nineteenth-Century Louisiana

CLAIRE C. GALLOWAY

RESEARCH ADVISOR: DR. SAM SHEPHERD
DEPARTMENT OF HISTORY
CENTENARY COLLEGE OF LOUISIANA
SHREVEPORT, LA

From April of 1865 through January of 1900, Mary Elizabeth Rives recorded her hopes, frustrations, and daily activities in her diaries. More than a century later, her personal papers have survived, and they illuminate the role of a woman in the late nineteenth-century South. They reveal a woman whose life revolved around her religious faith and her role as a caretaker for her family. Seventeen separate diaries have survived. These diaries are a ripe harvest that has been untouched for many years. Her entries especially portray her roles as a house manager, nurse, grieving mother, and spiritual guardian. Because the diaries span more than thirty years, they illustrate Mary's difficulties as she aged. Her entries serve as a glimpse into a female world that no longer exists. The consistency with which she wrote in both her diaries as well as her letters provides a window into her life as well as into the lives of other middle class southern women of the late nineteenth century. Work, illness, death, and religion were major, dominant experiences of women whose identity revolved around being devout and devoted caretakers.

"I'll deliver all...": Giordano Bruno and the Promise of Occult Sciences in *The Tempest*

PRESENTER: LISA GAME
DR. STEVEN SHELBURNE

DEPARTMENT OF ENGLISH
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SHREVEPORT, LA

Shakespeare's *The Tempest* presents us with Prospero, a magician we are unlikely to understand in our modern age. In order to remedy this, we need to know more about the occult system that the play alludes to. Key models for Prospero might include Doctor John Dee, Cornelius Agrippa, and Giordano Bruno. Bruno developed a memory system valuable in helping to clarify *The Tempest* that could also be considered an important precursor to modern scientific thought. By studying this system, it is possible to more fully comprehend the role magic played, in the past, in an attempt to understand the universe much in the same way that Bruno's contemporaries turn to science for their answers.

Constructs of Race in the Rastafari Cult of Jamaica

JONATHAN M. HAMMETT

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DEPARTMENT OF RELIGIOUS STUDIES, HUMANITIES
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Rastafari, an indigenous Jamaican religion, has undergone many upheavals since its inception in 1930, including an apparent change in the Rastaman's construction of race. Most Rastas from 1930 through the 1950s despised White culture, referring to it as Babylon, the Biblical tyrant nation who held the nation of Israel in captivity for many years. Extending this analogy to see themselves as the children of Israel, Rastas have historically held deep contempt for all things non-African. This appears to have changed during the period 1960-1980. During this time period, four key events could have had a profound effect on the attitudes of Rastas toward other races. The four possibilities are the victory of the People's National Party and Michael Manley in the 1960 elections, the visit of Emperor Haile Selassie I of Ethiopia to Jamaica in 1966, the death of Selassie in 1975, and the career of Bob Marley post-1975. Any combination of these could have contributed to the change observed. However, it may be possible that my initial observations were incorrect or based on invalid assumptions, and that no observable change has taken place, leaving us with the conclusion that the Rastas of Jamaica have never been militantly anti-White.

The Complete Church: The Need for Integrated Sunday School in the Local Church

SUSANNA MILLER

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DEPARTMENT OF RELIGIOUS STUDIES, HUMANITIES
CENTENARY COLLEGE OF LOUISIANA
SHREVEPORT, LA

Children with mental disabilities possess the capability of full involvement in Sunday school if the child participates in an "inclusive classroom" (a classroom where children with disabilities interact with children without mental disabilities) in their secular school setting and the religious instructors adequately receive support and training in the work with the mentally disabled. This paper com-

bines the practical approach of inclusion in the secular educational environment with the theological assumption that God values all people equally. This study demonstrates how the church can appropriately advance in secular education within religious educational contexts while retaining theological and ecclesiastic integrity. This study also demonstrates the church's need to provide more adequate training for the teachers who work directly with mentally disabled children, for the children in the classroom with the mentally disabled students, and for the church as a whole to utilize my findings in a professional religious educational setting.

Mystical Anorexia Nervosa

VALERIE B. OLSON

DEPARTMENT OF RELIGIOUS STUDIES, HUMANITIES
CENTENARY COLLEGE OF LOUISIANA
SHREVEPORT, LA

This study argues that the ascetic Christian practice of fasting associated with the late medieval female Catholic mystics, Hadewijch (13th century), St. Catherine of Siena (1347-1380), and St. Teresa of Avila (1515-1582), represents today's clinical understanding of the psychological implications of anorexia nervosa, including distorted body concept, distorted assessment of bodily operations, and a sense of incompetence. This study examines Hadewijch's, St. Catherine of Siena's, and St. Teresa of Avila's own writings as well as scholarly research on their writings and their lives in relationship to the three psychological factors of anorexia nervosa. While scholars across various fields debate the validity of diagnosing the practice of these medieval mystics as the clinical disease anorexia nervosa, my findings emphasize that Hadewijch, St. Catherine of Siena, and St. Teresa of Avila suffered from the eating disorder.

The Contrast of Liberalism and Conservativism Over Traditions: A Case Study Focusing on the British Monarchy

STUART PONDER

RESEARCH ADVISOR: DR. CHRIS CIOCCHETTI
DEPARTMENT OF PHILOSOPHY
CENTENARY COLLEGE OF LOUISIANA
SHREVEPORT, LA

This study examines the contrasting views between liberalism and conservatism on the practical value of traditions in society with a case study focusing on the British monarchy. By examining representatives from both schools, this study attempts to bridge the differences between the two by taking suggestions from each philosopher and synthesizing them into a system that enables traditions to carry weight in modern civilization. Liberals, and more specifically John Rawls, insist on an equal distribution of primary social goods, unless inequality serves to benefit the least-advantaged class in society. The British monarchy, while unjust because it is an inherited position of authority, can use its ceremonial prestige to serve the least advantaged classes of British citizens. Conservatives are generally more receptive to traditions, and the two primary influences of this study, Michael Walzer and Alasdair MacIntyre, offer traditions the means to adapt to changes in society. With the necessity of change, traditions change to more effectively honor the past. With the combined liberal quest for justice and conservative ability to change, a bridge is built between the two schools, which helps define their proper role in modern society.

Six Degrees of Homer Plessy: French Influences on one of the Most Influential Court Decisions in American History

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The landmark Supreme Court decision of *Plessy v Ferguson* (1896) sanctioned six decades of Jim Crow by asserting that “separate, but equal” accommodations were constitutional. Although its consequences are well known,

relatively little work has been done detailing the cultural and intellectual underpinnings of the case. My paper investigates the often-overlooked impact that nineteenth century French intellectual trends had on the French-speaking *gens de couleur* (“people of color”) in New Orleans. I argue that because the city had stronger ties to these trends than any other municipality in the United States, the case could only have happened there.

Caste Position and Religious Syncretism Among the Cochin and Bene Israel Jewish Communities of India

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The two native Indian Jewish communities of the pre-British period employed markedly different strategies of survival in their host communities. The Cochin became high caste traders and agricultural magnates while retaining much of their Jewish identity. They successfully acculturated by borrowing ritual symbols from the greater Hindu culture. The Bene Israel were relegated to a position coinciding with that of the native small farmers. They lost much of their Jewish identity and instead adopted an Indian caste identity based on their occupation as oil pressers and the remnants of certain Jewish ritual and practice.

This study seeks to provide a complex explanation of this dichotomy by exploring both group’s history and development. It will focus on the creation and reinforcement of caste within pre-modern Indian society and the different social collateral brought by each group to their host communities. This will be accomplished through historical analysis of the recent literature. The projected findings will show that the relatively intactness of Jewish identity will have a direct correlation with the caste position of each community. The Cochin had the opportunity to acculturate due to their high value to the local host community while the Bene Israel possessed neither a well-developed sense of rabbinical Judaism nor valuable skills and contacts with the trading West. Thus, they were forced to assimilate in order to find a niche in Indian society.

A Comparison of Adjustments Made by Campus Crusade for Christ and the Black Panther Party to Changing Cultural Climates

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This research paper intends to compare strategies used by two different organizations to adjust to changing cultural climates. These two organizations, Campus Crusade for Christ and the Black Panther Party, have had relatively few academic works written about them. This research intends to compile the information available about these two organizations and attempt to ascertain if these organizations have any common factors. The Black Panther Party officially disappeared in 1982. This paper intends to determine if the culture in which the organization thrived shifted. If it did shift, then this paper wants to discover what impact that shift had on the fate of the Black Panther Party. If the shift had a significant on the demise of the Black Panther Party, what did the organization do to adjust to the shift. Next, the paper intends to see if another organization which thrived in a particular cultural climate, Campus Crusade for Christ in a Modern culture, can learn from the mistakes of the Black Panther Party. Many philosophers, sociologists, and religious studies academics argue that Western culture has shifted from Modernism to Postmodernism. This paper intends to examine Campus Crusade for Christ's strategies for continuing its mission in the new cultural climate.

Research Papers

Natural Sciences

Synthesis of Metal Particle Catalysts via Reverse Micelles for Carbon Nanotube Growth

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NCMR
C/O NASA-GLENN RESEARCH CENTER

This work demonstrates a new process for producing metal nanoparticles that catalyze the growth of carbon nanotubes (CNT's). In particular, we used or modified procedures in the literature that employ microemulsions that contain inverse micelles to synthesize these metal particles. The nanoparticles produced which include Cu, Co, Ni, FePt, Fe(OH)₃, Fe₂O₃, and Mo, were then applied to various substrates (quartz and Mo strips, SiC and carbon fibers, and stainless steel, Ni, Cu, and Al/Mg meshes). The coated substrates were then placed in a tube furnace to initiate CNT growth using the Chemical Vapor Deposition (CVD) method. Nanotube yield and morphology were determined using scanning electron microscopy (SEM) and transmission electron microscopy (TEM). The results obtained demonstrate the effects on CNT growth of metal catalyst preparation method, substrate, method of application, and CVD conditions.

Statistical Analysis of Sociological Interaction

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Motivated by Dr. Stafford's interest in investigating how people interact in various social situations, a method

was developed to statistically analyze the recorded interactions of a group of individuals. The data examined were the separation distances between each individual and every other individual at various times during observation. The equations used in the data analysis were derived from structure functions used to study fluid states of matter. This method of describing the structure of a liquid uses the radial distribution function $g(r)$, which measures the probability of finding another molecule at a distance r from a central reference molecule. These equations were adapted to the purposes of this project by considering a number of individuals, N , in a total area, A . The number of individuals, $n(r)$, in the area element, $2\pi r dr$, at a distance r from the central point of reference is then given by $n(r) = \frac{N}{A} g(r) 2\pi r dr$. By determining the appropriate values for a given moment of interaction and then averaging these values over time both for individuals and for the entire group, one gets a set of probability distributions that illustrate the trends in group interaction over time.

How to Take Pictures of a Mouse Brain for Under \$100,000

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Recent work in the area of neuroscience has shown that the light reflectivity of the brain is altered slightly whenever the brain is activated. This phenomenon can be exploited to image brain activity at a microscopic level but the drawback is the elevated cost of the equipment, currently approaching \$100,000. The purpose of our project is to attain the same capability at a much lower cost. To this end we developed an imaging system based on a CCD astronomy camera, which was focused on the mice's somatic sensory cortex through an opening in the animal's skull. Here we present preliminary images acquired with our system showing brain activity induced by whisker stimulation.

An Improved Assay for Chitin Deacetylase

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The most widely used assay for the enzyme chitin deacetylase allows the enzyme to act on chitin dispersed into a colloidal form. At periodic intervals, aliquots are removed and chitin precipitated by centrifugation. The amount of acetate in the supernatant is measured through a series of coupled enzymes that ultimately produce a stoichiometric amount of NADH. This assay, while accurate, was deemed unsuitable for our application.

Accordingly, we have developed an alternative assay scheme that uses a modified, soluble form of chitin as substrate, and uses a less expensive set of enzymes to couple acetate liberation to production of NADH. This modified assay thus provides for rapid “real time” observation of chitin deacetylase reaction rates at substantial lower costs.

The Working Reality of Low-Temperature CdSe Semiconducting Nanocrystal Synthesis and the Mathematical Modeling of Crystallization

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Low-temperature synthesis towards the functional size and quality control of cadmium-based nanocrystals, as well as the mathematical modeling and simulation of basic crystallization, is investigated. The trials were to determine, among a host of variable factors, what combinations of techniques and chemical species produced high-yield, high-monodispersed, easily growth-controlled cadmium-selenide nanocrystals (quantum dots, specifically). Some such variables are cadmium and selenium precursors, types of noncoordinating solvents and coating ligands, and reaction temperatures. Such developed techniques are

compared to proven, high-temperature techniques and critiqued. A few novel digressions are found in data, affected by ligand concentration and “doping” techniques involving the noncoordinating solvent. Crystallization modeling and simulations are highlighted to balance conflicting views and data between classic crystallization theory and current experimental results. A working model is sought to bridge the differences between the two.

A Biogeographic Analysis of *Orthogeomys cherriei* in Nicaragua and Costa Rica Based on Variation in the Cytochrome B Gene

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Until 1970 *Orthogeomys cherriei* was known only from the eastern versant of the Cordillera Central in Costa Rica. Subsequently, numerous specimens have been captured west of the mountains, but there is variance between the specimens from either versant of the mountains. A phylogenetic analysis of the Cytochrome B gene was used to reveal biogeographical relationships between Atlantic and Pacific variants of *O. cherriei*. In this project I expanded an existing database with a specimen from Nueva Guinea in Eastern Nicaragua. DNA was extracted from the tissues, the Cytochrome B gene was isolated and amplified using PCR techniques, visualized using gel electrophoresis, purified, and sent to LSU School of Veterinary Medicine for sequencing. The results were compiled and scored according to a maximum parsimony algorithm which produced a phylogenetic tree. The results showed the specimen diverged 21.6% from other *O. cherriei* populations. The specimen was concluded to probably represent the related species *Orthogeomys metagalpa* known from northeastern Nicaragua. It provides a strong outgroup for comparison and is our first sequence of *O. metagalpa*.

Nitric Oxide (NO) and Hypoxia: Production of NO-stores via a NOS-Independent Mechanism?

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Ischemia (localized tissue anemia due to obstruction of arterial blood flow) and reperfusion (reconstitution of blood flow) occur during heart attacks, strokes, as well as during many surgical procedures, and often result in tissue injury. Despite intense research, the mechanisms underlying *ischemia/reperfusion* injury are incompletely understood. What appears clear, however, is that somehow nitric oxide (NO) is involved in both deleterious and protective actions. NO can not be produced via nitric oxide synthase due to the lack of available oxygen; however, nitrite could be reduced to produce NO under ischemic conditions. An initial organ bath experiment with Wistar rat aortic rings revealed that NO-stores increased 300-600% following a period of hypoxia. To investigate the possibility that these stores are formed via nitrite, we quantified basal levels of nitrite in several organs and secondly, determined that an increase in nitrite availability resulted in increased levels of NO-stores *in vivo*. Increase in tissue nitrite was associated with a drastic increase in S-nitrosothiol levels (22-fold and 83-fold in liver and heart) and N-nitrosoamines. These results indicate massive nitrosation of both thiols and amines with increased availability of nitrite. Both compound classes have been shown to release NO under appropriate conditions, suggesting a NOS-independent mechanism for NO production under physiological conditions.

Proposed Link between Helicobacter Pylori Infection and Sudden Infant Death Syndrome (SIDS)

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Sudden infant death syndrome (SIDS) is the major cause of postneonatal death in the developed world. It is

defined as “the sudden death of an infant or young child, which is unexpected by history and in which a thorough postmortem examination fails to show an adequate cause of death.” *Helicobacter pylori* (Hp) infection has recently been implicated in the pathogenesis of SIDS. To investigate this association, DNA was extracted from paraffin embedded stomach and duodenum tissue samples of SIDS victims and tested for the *Hp ureC* sequence using real-time polymerase chain reaction (PCR). *Hp* DNA could not be detected in any of the tissue samples. It was concluded that *Hp* infection is most likely not associated with SIDS.

Probing RNA Conformation Changes by Fluorescence Spectroscopy

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Flavine adenine dinucleotide (FAD) exhibits fluorescence due to its isoalloxazine conjugated ring structure. In principle, this fluorescence can be used as a tool to detect conformation changes in FAD-coupled macromolecules. We tested this with the recently synthesized RNA ribozymes, able to catalyze the synthesis of flavine adenine dinucleotide (FAD) from flavine mononucleotide (FMN). It is known from kinetic data that these ribozymes require the presence of divalent cations Mn^{++} and possibly Ca^{++} . We used fluorescence spectroscopy of FAD-RNA to study the possible effect of the cations on the structure of the ribozyme. None of the tested cations influenced fluorescence of free FAD, but Mn^{++} caused a significant increase in fluorescence of FAD-RNA, which is ascribed to a Mn-induced conformation change in RNA. We conclude that FAD fluorescence can be used to monitor conformation changes in FAD-ribozymes. The current results will be confirmed and extended by time-resolved fluorescence spectroscopy.

Developing Methods Acid Digestion of Basalts for Use with Inductively Coupled Spectrometry System (ICP-MS)

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Geochemical data are useful in determining the petrogenesis of rocks. One way to obtain such data is through mass spectrometry. Since its invention, the inductively coupled plasma mass spectrometry system (ICP-MS) has been used to analyze a wide range of substances including water, blood and soils. To introduce substances into the ICP-MS, samples must first be put into solution. Due to the great sensitivity of the machine, sample concentration needs only to be in the ppb range. Many of the common substances analyzed by ICP-MS systems have documented preparation procedures. Rock, being slightly less common, has limited information, and that which is published pertains to specific rock types and chemical compositions. However, compositions vary with location. Thus, the goal of this project was to develop, test, and analyze precise methods for sample preparation of basalts using acid digestion. The method employed called for the use of an MDS-2000 (Microwave Digestion System). USGS standards were prepared using the developed method and were then analyzed by the ICP-MS system. After establishing the method, basalt samples from the Snake River Plain suite were prepared and analyzed.

Heterozygosity for Hemochromatosis is Associated with Lung but not Head and Neck Cancers

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Hereditary hemochromatosis (HH) is a common, autosomal recessive disorder of iron metabolism caused by a

mutation in the HFE gene on chromosome 6. The mutation causes an increase in iron absorption, which results in excess deposition of iron in the parenchymal cells of multiple organs resulting in diabetes, liver failure, cardiac dysfunction, and arthritis. HH heterozygotes have slightly increased iron absorption, which may result in increased total body iron. Recent studies suggest that HH heterozygotes may have an increased risk for developing cancer. A case-control study was done to determine if HH heterozygotes carry an increased risk for either cancer type. More than 90% of HH patients have a single missense mutation, causing an amino acid substitution at residue 282 (C282Y) in the HFE protein. We screened for the C282Y mutation in 176 Caucasian patients diagnosed with lung or head and neck cancer and 391 matched controls. Genomic DNA was isolated from whole blood and the C282Y mutation was detected by allele-specific PCR. Of the 176 cancer patients, 14.2% were heterozygotes compared to only 10.0% of the 391 controls. The prevalence of the C282Y mutation was significantly higher among female patients, 17.7% ($p=0.01$), than in female controls, 9.6%.

Effect of Oxidative Challenge on Normal and Cancerous Colon Cells

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The balance of the oxidation-reduction (redox) state in a cell is maintained by the status of reduced glutathione (GSH) and glutathione disulfide (GSSG), the major redox couple of a cell. This is achieved through the enzymatic functions of GSH peroxidase and GSSG reductase coupled with the NADP⁺/NADPH redox pair. When cells are subjected to oxidative challenge, their redox status undergoes an imbalance, and it is important that they have ample glucose supply and pentose phosphate shunt activity to regenerate NADPH for GSSG reduction in order to regain homeostasis, otherwise cells may undergo apoptosis. Our goal was to study the differential responses of normal human colon cells (NCM 460) versus cancerous human colon cells (CaCo-2) to oxidative challenge caused by diamide, a thiol oxidant. In order to study the cellular responses to this challenge, we monitored the levels of glutathione reductase and glucose-6-phosphate dehydrogenase in both cell lines following oxida-

tive challenge. In addition, we determined cell apoptosis after treatment with diamide. NADPH levels and GSH/GSSG levels were also determined following diamide challenge. We found that CaCo-2 cells were much more susceptible to diamide treatment because they showed a significantly higher extent of apoptosis and significantly lower glucose-6-phosphate dehydrogenase activity, NADPH levels, and GSH levels. However, there was a much lower occurrence of apoptosis in NCM460 cells. These cells also maintained normal levels of glucose-6-phosphate dehydrogenase, NADPH, and GSH during oxidative challenge, which allowed them to recover quickly from oxidative stress. Therefore, we concluded that normal colon cells had a greater ability than cancer colon cells to withstand oxidative challenge. This characteristic could be capitalized for development of therapeutic interventions against cancer cells.

Diagenetic Patterns and Reservoir Development in the Woodbine Formation, Tyler County, Texas

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The Upper Cretaceous Woodbine Formation of Tyler County, Texas, developed in a shelf to slope environment. The sandstones produce hydrocarbons from several fields, including AA and Damascus fields. This study focuses on diagenetic patterns and reservoir development of the Woodbine Formation in the Hunt Oil Tapscott 1, the Humble Oil Howell 1, the Standard Longbell 2, and the Cities Services B-1 Sutton at burial depths of 11,200' to 14,816'. The shale-rich section contains isolated very fine- to fine-grained sand bodies comprised predominantly of detrital quartz with minor calcite fossil fragments and lithic grains. Common secondary minerals include quartz overgrowths, chlorite, calcite, and iron-rich dolomite. Quartz overgrowth development prior to and partly contemporaneous with chlorite growth dominated the early diagenetic history. This was followed by a period of carbonate cementation and localized later dissolution. Authigenic kaolinite filled some of the remaining pore space. Where present, relatively early quartz overgrowths and/or calcite cement prevents extensive compaction and related porosity loss in matrix-free sandstones. Primary

porosity is preserved in the Howell and Sutton wells where secondary quartz is limited. Authigenic chlorite in primary intergranular pores is common, and its locally-abundant presence results in extensive microporosity. The dissolution of unstable detrital grains also produced secondary porosity in both wells.



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